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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/688,717	10/16/2000	Edward J. Fiore	98-046-NSC/STK98046PUS	3002

7590 10/22/2004

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EXAMINER	
PHAN, MAN U	
ART UNIT	**PAPER NUMBER**
2665	

DATE MAILED: 10/22/2004

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	09/688,717	FIORE ET AL.	
	Examiner	Art Unit	
	Man Phan	2665	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *02 July 2004*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-36* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☒ Claim(s) *33-36* is/are allowed.

6)☒ Claim(s) *1,8,10,12-20 and 23-32* is/are rejected.

7)☒ Claim(s) *9,11,21 and 22* is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

Response to Amendment and Argument

1. This communication is in response to applicant's 07/02/2004 Amendment in the application of Fiore for an "Arbitrated Loop Port Switching" filed 10/16/2000. The amendment and argument has been entered and made of record. 1, 13, 18, 24, 28, 31 have been amended, and newly claims 33-36 have been added. Claims 1-36 are pending in the application.

2. Applicant's amendment and argument to the rejected claims are insufficient to distinguish the claimed invention from the cited prior arts or overcome the rejection of said claims under 35 U.S.C.103 as discussed below. Applicant's argument with respect to the rejected claims have been fully considered, but they are not persuasive for at least the following reasons:

3. Applicant's argument with respect to the rejected claim 1 (Page 13, second paragraph) that the cited references do not teach or suggest the "*forming a separate loop containing only those nodes necessary to support the requested communication*". However, Chan et al. (US#5,751,715) is applied herein merely for the teaching of the accelerated Fiber Channel protocol handshaking and data exchange involves dividing a Fiber Channel arbitrated loop architecture up into a plurality of arbitrated subloops. Fig. 5 shows a "loop tenancy," the hanshaking protocol traffic which occurs between nodes before the loop is relinquished and other nodes are allowed to communicate. A loop tenancy protocol is carried out so that a source node

and a destination node can acquire the loop for their exclusive use in a data transfer operation (*separate loop containing only those nodes necessary to support the requested communication*). Each node has a priority ranking which is used during a process called arbitration. Arbitration is a process to decide which of 2 or more nodes which are simultaneously requesting control of the loop will get control of the loop. In the loop tenancy protocol shown in Fig. 5, an arbitration occurs, followed by an open (transmitted by the winning node), followed by transmission of one or more data frames, followed by a close (which can be transmitted by either node)(Col. 1, lines 54 plus). Applicant further asserted that the reference does not teach or suggest "*the controller controls the interconnect switch to form separate communication loops based on detected*"(page 13, third paragraph, and page 14, second paragraph). However, Chan discloses in Fig. 8A a block diagram illustrated the architecture of an accelerated Fibre Channel local area network implemented using an accelerated protocol Fibre Channel hub having four hub ports coupled to four subloops. Each hub port contains a state machine which does switching function and fill word generation to implement the accelerated protocols described herein by using a plurality of switching, fill word generation and token passing rules (*control the interconnect switch to form separate communication loops*). The state machine in each hub port is coupled to its local subloop and to its neighboring hub ports through a single TDMA bus which has timeslots dedicated to carrying broadcast loop and return loop data path traffic and control token traffic (Col. 4, lines 26 plus). Furthermore, A Fibre Channel Arbitrated Loop specification (FC-AL) Rev. 4.34 X3T11 Project 960D dated Sep. 18, 1994, which describes both switch fabric and arbitrated loop configurations. In an arbitrated loop configuration, nodes are daisy-chain

connected to form a loop, with the transmitter circuitry of one node connected to the receiver circuitry of another. Nodes connected in an arbitrated loop configuration arbitrate for access to the loop by passing arbitration primitives around loop. Once a node obtains access to the loop, thereby becoming a source node, a destination node is "opened" and the transmission between the source node and destination node becomes a point to point transmission, with intermediate nodes positioned between the source and destination nodes on the loop passing data through to the next port on the loop.

Examiner maintains that the references cited and applied in the last office actions for the rejection of the claims are maintained in this office action.

Claim Rejections - 35 USC ' 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. Claims 24-32 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (US#5,751,715), in view of Gallagher et al. (US#5,619,497).

With respect to claims 24-27, Chan et al. (US#5,751,715) discloses an accelerator fiber channel hub and protocol. Chan teaches the architecture of an accelerated Fibre Channel local area network (Fig.8A) implemented using an accelerated protocol Fibre Channel hub (*Interconnect system*) having four hub ports coupled to four subloops (*private loop devices*), although any number of hub ports and subloops can be used. The function of these hub ports is to implement an accelerated Fiber Channel protocol handshaking and data exchange involves dividing a *Fiber Channel arbitrated loop* architecture up into a plurality of arbitrated subloops (*private loop devices*), each of which arbitrates locally using the same fundamentals as the Fiber Channel arbitration protocol but with some slight modifications which do not affect the compatibility of standard Fiber Channel nodes. Each subloop (*private loop devices*) is coupled to a hub port which contains a state machine which does switching function and fill word generation to implement the accelerated protocol by using a plurality of switching, fill word generation and token passing rules (Col. 4, Lines 26 plus).

However, Chan does not discloses expressly a fibre channel private loop device interconnect system disposed with each port interface to forward data between any send data path and any receive data path. Gallagher et al. (US#5,619,497) discloses a method and apparatus for coupling a plurality of channels of a communications network to a node. Gallagher teaches a switch fabric interconnecting a plurality of nodes having ports (Fig. 1), each adapted for connection to a corresponding channel and a system interface adapted for connection to a plurality of node clients in the form of host computers, peripheral devices, network interfaces, etc. The frame routing step includes determining the identity of a destination node specified in a

processed frame, accessing a look-up table to determine a port associated with the determined destination node, and routing the processed frame to the port associated with the destination node (Col. 3, Lines 66 plus). Gallagher teaches the frame routing circuit of the shared node of a switch fabric interconnecting a plurality of nodes (Figs. 12, 16). The shared node includes a frame prioritization circuit, or multiplexer, for selecting frames received by the ports for forwarding to a frame handler for processing. Also provided is a frame routing circuit, or demultiplexer, for *routing frames* processed by the frame handler to at least one of the ports for transmission to one or more destination nodes (Col. 3, Lines 13-18). Gallagher further teaches a Fibre Channel Arbitrated Loop specification (FC-AL), which describes both switch fabric and arbitrated loop configurations. In an arbitrated loop configuration, nodes are daisy-chain connected to form a loop, with the transmitter circuitry of one node connected to the receiver circuitry of another. Nodes connected in an arbitrated loop configuration arbitrate for access to the loop by passing arbitration primitives around loop. Once a node obtains access to the loop, thereby becoming a source node, a destination node is "opened" and the transmission between the source node and destination node becomes a point to point transmission, with intermediate nodes positioned between the source and destination nodes on the loop passing data through to the next port on the loop (Col. 20, Lines 18-31).

Regarding claims 28-32, they are method claims corresponding to the apparatus claims 24-27 above. Therefore, claims 28-32 are analyzed and rejected as previously discussed with respect to claims 24-27.

Chan and Gallagher are in the same field of endeavor for the purpose of interconnection to input/output channel and networking systems in Fibre Channel Arbitrated Loop system. Therefore, It would have been obvious to one having ordinary skill in the art at the time the invention was made, to incorporate a method and apparatus for reordering frames of Gallagher in the method of accelerating arbitration on a fibre channel arbitrated loop protocol network of Chan et al., because Gallagher suggests a communication network for routing frames between nodes connected to the network, and Chan teaches a method of accelerating arbitration on a fibre channel arbitrated loop protocol network comprised of multiple fibre channel nodes for the purpose of providing a communication system with the capability of fibre channel interconnection of a plurality of private loop devices through a fibre channel private loop device interconnect system.

6. Claims 1-8, 10, 12-20 and 23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Chan et al. (US#5,751,715) in view of Gallagher et al. (US#5,619,497) as applied to the claims above, and further in view of Black et al. (US#6,614,796).

With respect to claims 13-20 and 23, Chan and Gallagher disclose the claimed limitations as discussed in the paragraph 3 above. Gallagher further teaches the switch fabrics include a plurality of switches arranged to permit transmission of frames over different paths, or channels. Each node has a port adapted for connection to a respective channel. One illustrative type of *switch fabric is Fibre Channel*, in which the nodes connected to the fabric are referred to as N.sub.-- Ports (Col. 1, Lines 21-26). Chan et al. further teaches the Fiber Channel protocol

handshaking and data exchange involves dividing a Fiber Channel arbitrated loop architecture (*Arbitrated Loop Physical Address configuration*) up into a plurality of arbitrated subloops, each of which arbitrates locally using the same fundamentals as the Fiber Channel arbitration protocol. Each subloop is coupled to a hub port which contains a state machine (*intelligent bridging loop*), which does switching function and fill word generation to implement the accelerated protocol by using a plurality of switching, fill word generation and token passing rules (Col. 4, Lines 26 plus and Col. 8, lines 1-3). In the same field of endeavor, Black et al. (US#6,614,796) discloses a switched architecture and process for transferring data through an Fibre Channel Arbitrated Loop (FCAL) switch. The switch uses multiple switch control circuits each coupled to one FCAL network and all connected to a crossbar switch. The switch control circuits are coupled together by a protocol bus for coordination purposes. Local conversations can occur on each FCAL loop and crossing conversations through the switch can occur concurrently. The Open Point to Point (OPN) primitive is used to establish the connection before any data is transferred thereby eliminating the need for buffer memory in the switch control circuits. The destination address of each OPN is used to address a lookup table in each switch control circuit to determine if the destination node is local. If not, the destination is looked up and a connection request made on the protocol bus. If the remote port is not busy, it sends a reply which causes both ports to establish a data path through the backplane crossbar switch (See Figs. 3-4 and the Abstract).

Regarding claims 1-8, 10, 12, they are method claims corresponding to the apparatus claims 13-20, 23 above. Therefore, claims 1-8, 10, 12 are analyzed and rejected as previously discussed with respect to claims 13-20, 23.

From the teaching of Black et al., It would have been obvious to one having ordinary skill in the art at the time the invention was made, to incorporate the switch control circuit operable in communication loop of Black; the techniques for processing frames at a node having a plurality of ports of Gallagher; and the accelerator fiber channel hub and protocol of Chan, because Black and Gallagher suggest a method and apparatus for providing the intelligent bridging hub, the route filtering in the network interconnection; the method for reordering frames between nodes connected to the network using the fiber channel fabric; and Chan teaches the arbitrated loop configurations for the interconnection between loops in Fibre channel.

Allowable Subject Matter

7. Claims 33-36 are allowable

8. Claims 9, 11 and 21, 22 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

9. The following is an examiner's statement of reasons for the indication of allowable subject matter: The closest prior art of record fails to disclose or suggest wherein the steps of acknowledging to the third/first node the request to open the second/third message transfer

operation after detecting the request from the third/first node to open a second/third message transfer operation; notifying the third/first node that the second/fourth node is busy in response to the status of the second/fourth node being busy; and notifying the second/fourth node of the request to open the second/third message transfer operation after switching the third/fourth node to the separate communication loop, as specifically recited in the claims.

Conclusion

10. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Black et al. (US#6,614,796) is cited to show the Fibre channel arbitrated loop bufferless switch circuitry to increase bandwidth without significant increase in cost.

The Baldwin et al. (US#6,215,775) is cited to show the node insertion and removal in a loop network.

The Xue et al. (US#6,687,219) is cited to show the detecting and counting node port loop initialization origination.

The Wong et al. (US#6,324,181) is cited to show a fibre channel switched arbitrated loop.

The Berman (US#6,118,776) is cited to show methods and apparatus for fibre channel interconnection of private loop devices.

The Berman (US#6,470,007) is cited to show an interconnect system for fiber channel arbitrated loop including private loop devices.

The Sanada et al. (US#6,742,090) is cited to show a fibre channel connection storage controller.

11. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION THIS ACTION IS MADE FINAL**. See MPEP ' 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the mailing date of this final action.

12. Any inquiry concerning this communication or earlier communications from the examiner should be directed to M. Phan whose telephone number is (571) 272-3149. The examiner can normally be reached on Mon - Fri from 6:00 to 3:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached on (571) 272-3155. The fax phone number for the organization where this application or proceeding is assigned is (703) 872-9306.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (571) 272-2600.

13. **Any response to this action should be mailed to:**

Commissioner of Patents and Trademarks

Washington, D.C. 20231

or faxed to: (703) 305-9051, (for formal communications intended for entry)

Or: (703) 305-3988 (for informal or draft communications, please label "PROPOSED" or "DRAFT")

Hand-delivered responses should be brought to Crystal Park II, 2021 Crystal Drive, Arlington. VA., Sixth Floor (Receptionist).

Mphan

10/20/2004.

MAN U. PHAN
PRIMARY EXAMINER